Center Independent Research & Development: GSFC IRAD

High-Performance Advanced Receiver Processor (HARP)

Completed Technology Project (2011 - 2015)

Project Introduction

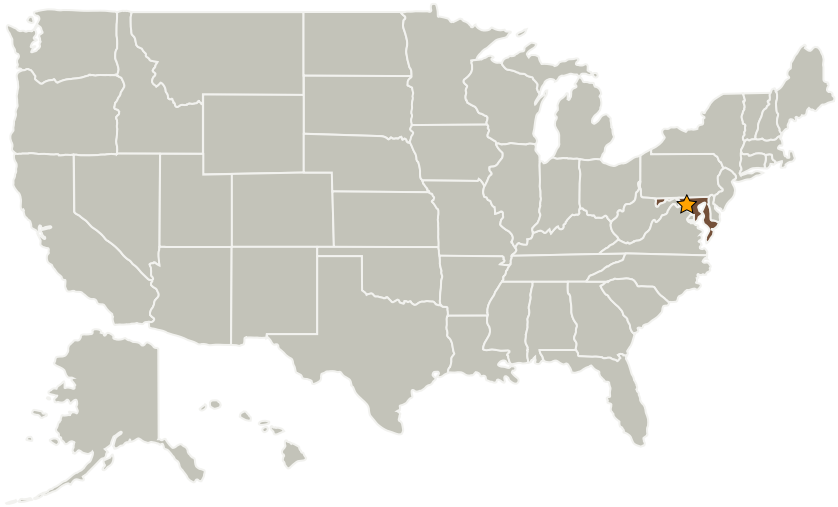
We are researching and developing a laser altimeter receiver. This receiver will employ multiple shot coincidence detection to maximize ranging capability with minimal laser-aperture size product and hence the cost. The proposed approach will increase the sensitivity of our receivers by a factor of 2. Advanced, high-performance, compact, low-power, on-board processor that increases the sensitivity of the receiver for laser altimetry and similar applications.

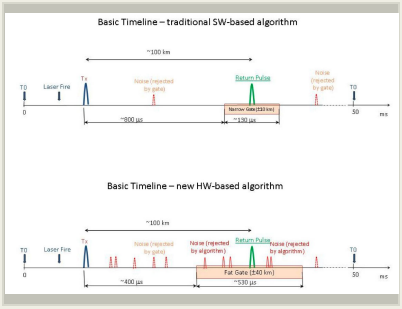
The pulse handling, and histogram and analysis functions are implemented in hardware at a high noise rate. Operation: a very large range gate is used to virtually eliminate tracking. At the end of a time period the histogram of the event times is analyzed, the range gate is determined with "20-20 hindsight," and select data is telemetered to the ground.

Anticipated Benefits

N/A

Primary U.S. Work Locations and Key Partners





Project Image High-Performance Advanced Receiver Processor (HARP)

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Maryland

Project Transitions

October 2011: Project Start

September 2015: Closed out

Closeout Summary: The purpose of the Goddard Space Flight Center's Internal Research and Development (IRAD) program is to support new technology development and to address scientific challenges. Each year, Principal Investigators (PIs) submit IRAD proposals and compete for funding for their development projects. Goddard's IRAD program supports eight Lines of Business: Astrophysics; Communications and Navigation; Cross-Cutting Technology and Capabilities; Earth Science; Heliophysics; Planetary Science; Science Small Satellites Technology; and Suborbital Platforms and Range Services. Task progress is evaluated twice a year at the Mid-term IRAD review and the end of the year. When the funding period has ended, the PIs compete again for IRAD funding or seek new sources of development and research funding or agree to external partnerships and collaborations. In some cases, when the development work has reached the appropriate Technology Readiness Level (TRL) level, the product is integrated into an actual NASA mission or used to support other government agencies. The technology may also be licensed out to the industry. The completion of a project does not necessarily indicate that the development work has stopped. The work could potentially continue in the future as a follow-on IRAD; or used in collaboration or partnership with Academia, Industry and other Government Agencies. If you are interested in partnering with NASA, see the TechPort Partnerships documentation available on the TechPort Help tab. http://techport.nasa.gov/help

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:

Peter M Hughes

Project Manager:

Wesley A Powell

Principal Investigator:

Richard B Katz

Co-Investigators:

Xiaoli Sun
Rafael A Garcia
Igor Kleyner

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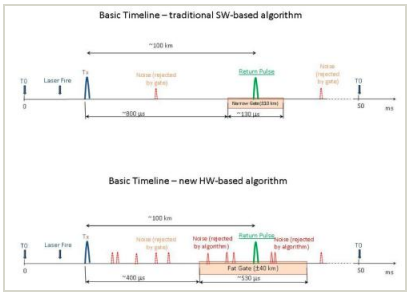
Images



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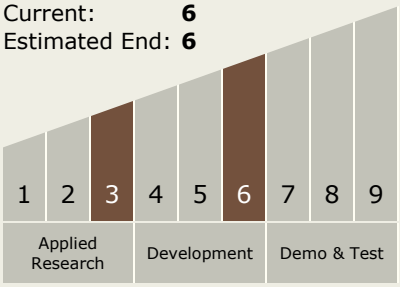
Project Image High-Performance Advanced Receiver Processor (HARP)
(https://techport.nasa.gov/image/36868)

Project Website:

http://sciences.gsfc.nasa.gov/sed/

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers